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METHODS OF ASCERTAINING THE COST OF CARRIAGE

BY

JOHN B. DAISH

WASHINGTON, D. C.

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METHODS OF ASCERTAINING COST OF CARRIAGE

By JOHN B. DAISH

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The purpose of this paper is to consider the several methods which have been used by tribunals to ascertain the cost of transporting freight—that cost being the cost to the carrier.

It is assumed, first of all, that charges for transportation should bear some relation to the cost of transportation. What this relation shall be, and whether or not cost shall exceed charges or vice versa, we shall not now attempt to concern ourselves with; we simply assume the fact that some relation should exist between these figures when ascertained.

It may be argued that, from a legal point of view, the cost of transporting goods having been once obtained, we are scarcely wiser than before. The Supreme Court of the United States has held that as a matter of law it is improper, in considering the reasonableness of a rate, to make a comparison of the intra-state rates of two states, and it is likewise improper, as a matter of law, to compare the intra-states rates of one state with the rates applying on interstate traffic originating in, destined to, or passing through the state which we have under consideration. However this may be as a matter of law, certain it is, that as a matter of business, no stronger argument can be adduced than to show by mathematical process that the rates of one state are greater or less than those of another; or that the local state rates are very much more than the interstate rates for traffic which, in its transit, enters the state one may be considering.[1]

We shall further assume that there has been determined and crystalized into currency, what we mean by the term "fair valuation" of the carrier's property. We are sup-

[1] Smyth *v.* Ames (169 U. S. 466).

posed to have agreed to consider some figure which may not be entirely dependent upon any one, but in fact an inference, if you please, from all of the following items: The cost of construction, the cost of reproduction, the valuation as a going concern, the valuation of the services of the entrepreneur; in short, we have placed in figures the "fair valuation" of the carrier's property in accordance with the rules of law, the demands of justice, and the requirements of good business.[2]

One other assumption, and that is that the carrier has given us upon oath such testimony as we shall have called for.

It should be remembered in considering this matter that cases involving the cost of traffic to the carrier may take either one or two forms, namely, of the schedule as a whole, or of a particular commodity. If we consider the schedule as a whole, we must perforce conclude that we have simply arrived at the beginning when we get our final figures, for we shall then be compelled to determine what relation each of the eight thousand articles in the classification shall bear to this average cost. If, on the contrary, we consider the cost of transporting a particular article, we shall then be under the necessity of determining what relation should subsist between the charges to be made for transporting this particular article and the cost of its transportation, and, if we are to aim at completeness, the relation between the cost of transporting this article and others or the relative charge to be made for them.

Cases requiring the ascertainment of the cost of transporting freight per unit arise in one of two ways; either a statute or an order of a railroad commission has prescribed

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[2] The "fair valuation" of the carrier's property must be taken into consideration in determining the reasonableness of its rates and charges. The elements which must be taken into consideration to ascertain the "fair valuation" have been named by the Supreme Court, but no definite mathematical rule by which to crystalize the "fair valuation" into currency has as yet been expressed. The elements are to be found in Smyth *v.* Ames (169 U. S. 466, 546). Upon the general subject concerning the necessity for considering the "fair valuation" of property as an element of reasonable charges, see Lindsley, "Rate Regulation of Gas and Electric Lighting."

a schedule of rates or a preliminary investigation to ascertain the cost precedes the making of such a schedule.

One of the earliest cases in which it was attempted to ascertain the cost of transportation was the case of Smyth *v.* Ames.[3] In that case the legislature of Nebraska had prescribed a schedule of rates applicable to the state tonnage moved upon all the carriers operating within that commonwealth. The facts before the courts were as follows: By expert testimony it was said the legislature-made rates reduced the charges upon freight traffic 29½ per cent; it was in evidence from expert witnesses that the cost of moving the purely intra-state traffic was from 10 to 25 per cent more than the cost of moving the interstate traffic, the court assumed that 10 per cent increase was a reasonable one; figures were introduced showing operating expenses and receipts, number of passengers carried, the tons of freight, and the mileage over which freight was transported.

With such evidence at hand, after separating the passenger traffic from the freight traffic, the court used the following method. Dividing the cost of freight operation by the receipts from freight operation, a result was produced of 66.24. These figures (66.24) were said to show the percentage which the operating expenses bore to the receipts upon all the traffic carried by the railroad, and hence represented the cost of carrying. As the evidence showing that the cost of doing the intra-state freight business exceeded the cost of doing all business 10 per cent, this last figure was added to the quotient heretofore obtained, making a total of 76.24. The legislature-made rates would reduce (according to the testimony) the receipts 29½ per cent That is to say, for each $100 of receipts, if it be assumed that the quantity of tonnage will not change (and the court made such assumption) the carrier would receive $70.50. Thus, under the legislature-made rates (and it being assumed that there would be no increase in tonnage) the carrier would expend in operating expenses $76.24 and receive in return $70.50. Of course, upon such a basis the court held the legislature-made rates of Nebraska unconstitutional, for the proposed rates would not be remunerative.

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[3] 169 U. S. 466.

The fallacy of the mathematics of this case can be seen from two points, even if we concede that there will be no increase or decrease in the yearly tonnage by reason of the change of rates or commercial conditions.

1. The percentage which the operating expenses bear to the receipts does not mean anything; it simply shows the relation between the two items; they both might be relatively high or low, or one or the other may be entirely disproportionate to fairness or good management or justice.

2. Again, a careful consideration of the exhibits in the case shows the prospective effect of the proposed reduction of rates upon several carriers. If this change of rates produces a reduction for one carrier, it is fair to conclude that it must produce a reduction for another. And so, if it produce a reduction for one carrier in a single year, it must produce a reduction for that carrier every year. Such, however, is not found to be the case. For example, the Fremont Company was shown, had this reduction of rates been applied in 1891, to have gained, while seven other roads would have lost; and, in 1892, the Fremont Company would have lost with five other companies, and the Union Pacific (which had been a loser the year before) would become a gainer; further, the Fremont Company in 1893 shifts to the other side of the line, becoming a gainer and holding the Union Pacific with it, while five other companies still remain losers.[4]

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[4] The statistics cover three years, 1891, 1892, and 1893. The companies were the Burlington, St. Paul, Fremont, Union Pacific, Omaha, St. Joseph, Kansas City. In 1891, had the earnings under the law been reduced, according to the expert testimony (29½ per cent) the several companies would have lost from 5.74 per cent to 59.76 per cent, except the Fremont Company, which would have gained 10.63 per cent. In 1892, the several companies would have lost from 3.73 per cent to 32.62 per cent, except the Union Pacific Company, which would have gained 4.06 per cent (the year before this company would have lost 8.44 per cent). In 1893, the several companies would have lost from 1.55 per cent to 33.64 per cent, except the Fremont Company and the Omaha Company, the forming gaining 6.84 per cent and the latter 1.99 per cent. The table in full is to be found in 169 U. S. 535.

Thus, it clearly appears that there must be some error in the mathematical method of this case.

The Supreme Court had occasion to consider the cost of transportation in the so-called South Dakota Case.[5] In that case a schedule of rates had been prescribed by the railroad commission of South Dakota. Here the Circuit Court assumed that for succeeding years the tonnage carried by the railroads would remain substantially the same, and it undertook to separate the passenger and freight business, and found from the testimony that the gross receipts from passenger business, had the legislature-made rates been in effect, would be reduced 15 per cent, and a reduction in freight charges would have diminished the gross receipts from that source by 17 per cent. It was also found that the cost of doing the business, as expressed in the term operating expenses, would be practically the same. The court below found the value of the particular carrier's[6] property in South Dakota to be $10,000,000,[7] but it was held that it was not fair to consider that sum as employed in doing the local business, for the same property was employed in doing the interstate business. The court below also found that the true way to determine the value of the property which is employed in the local business was to divide the total valuation of $10,000,000 according to the proportion that existed between the amount of gross receipts from the interstate and from the local business, both of which amounts were accurately stated.[8] Upon this basis of division it was found that the value of the property employed in local business in a particular year[9] was $1,900,000; dividing this amount by the gross receipts from local business, it was ascertained that these receipts represented 16.03 per cent of the valuation. The court then proceeded upon the supposition that the commission's

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[5] C. M. & St. P. R. R. *v.* Tompkins (176 U. S. 171).

[6] C. M. & St. P. R. R.

[7] This fact was found by the court below, notwithstanding evidence to the effect that it was bonded for over $19,000,000.

[8] The receipts from local and interstate business were ascertained from the testimony of the carrier.

[9] The court considered the effect of the statute for four years.

schedule of rates had been enforced during the year it had been considering. Taking the supposed reduced earnings, it found that the valuation of the carrier's road engaged in the local business would have been $1,600,000, and upon such basis that the gross receipts from local business (under revised schedules) would have amounted to 16.02 per cent of the valuation of the property. As a matter of law, it was held that the variation of percentage was not sufficient to justify a declaration that the reduced rates prescribed by the commission were unreasonable; in short, the court below was of the opinion that the earning capacity of the road was so slightly reduced that it could not be affirmed that the new rates were unreasonable.

Commenting upon this method the Supreme Court of the United States suggests that there must be some fallacy in it for reason that while the new schedule would reduce the actual receipts on freight business 17 per cent, the earning capacity was diminished only one-tenth of one per cent. "Such a result," says the court, "indicates that there is something wrong in the process by which the conclusion is reached." To show the fallacy of this method and attempt to ascertain the cost of transportation, the court took round numbers. "Suppose the total value of the property in South Dakota was $10,000,000, and the total receipts from both interstate and local business were $1,000,000, one-half from each. Then, according to the method pursued by the trial court, the value of the property used in earning local receipts would be $5,000,000, and the per cent of receipts to value would be 10 per cent. The interstate receipts being unchanged, let the local receipts by a proposed schedule be reduced to one-fifth of what they had been, so that instead of receiving $500,000, the company only receives $100,000. The total receipts for interstate and local business being then $600,000, the valuation of $10,000,000, divided between the two, would give to the property engaged in earning interstate receipts in round numbers, $8,333,000, and to that engaged in earning local receipts, $1,667,000. But if $1,667,000 worth of property earns $100,000 it earns 6 per cent. In other words, although the actual receipts from local business are only one-fifth of

what they were, the earning capacity is three-fifths of what it was. And, turning to the other side of the problem, it appears that if the value of the property engaged in interstate business is to be taken as $8,333,000, and it earned $500,000, its earning capacity was the same as that employed in local business—6 per cent. So that although the rates for interstate business be undisturbed, the process by which the trial court reached its conclusion discloses the same reduction in the earning capacity of the property employed in interstate business as that employed in local business, in which the rates are reduced. Again, in another way, the error of the court's computation is manifested. The testimony discloses that the operating expenses of the entire system during each of the four years were over 60 per cent of the gross receipts. If the cost of doing local business in South Dakota was the same as that of doing the total business of the company, then the net earnings of that local business would not exceed 40 per cent of the gross receipts. Reduce the gross receipts 15 per cent, and the reduction by the defendant's rates was 15 per cent on passenger and 17 per cent on freight business, it would leave only 25 per cent of the gross receipts, as what might be called net earnings, to be applied to the payment of interest on bonds and dividends on stock. But the testimony shows that the cost of doing local business is much greater than that of doing through business. If it should be 85 per cent of the gross receipts (and there was testimony tending to show that it was as much if not more) then a reduction of 15 per cent in the gross receipts would leave the property earning nothing more than expenses of operation. These computations show that the method which the court pursued was erroneous, and that without a finding as to the cost of doing the local business it is impossible to determine whether the reduced rates prescribed by defendants were unreasonable or not.[10]

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[10] The decree of the trial court dismissing a bill to restrain the enforcement of a schedule of maximum rates was reversed, but the court in its opinion recommended that the testimony should be referred to some competent master, general or special, to make finding of facts.

In a recent case [11] before the Kentucky Railroad Commission, an attempt was made to arrive at an approximation of the cost to a carrier for doing the freight service in that state during the year 1905 upon a ton mile basis. It was in evidence from the carrier what amount of the money was properly chargeable to the intra-state freight traffic. This was separated by the carrier into two parts, one chargeable to haulage or transportation and the other to services other than haulage or transportation, such as terminal charges. It was decided that the total of the amount chargeable for haulage is fairly apportionable between intra- and interstate freight upon the basis of total ton miles. The charges for services other than haulage or transportation was said to be fairly apportionable between each of the two classes of freight based upon the number of tons. The carrier having given figures as to the average length of haul of interstate and intra-state freight, the amount chargeable to charges other than for haulage was divided by the number of tons, (inter-plus intra-state) and this was found to give an average charge per ton for station loading and unloading, advertising, damage, and, in fact, all services except haulage of 16.25 cents per ton. This amount was then divided by the average haul of the state traffic and produced a result of .1659 cent. In order to secure a comparison between the inter- and intra-state traffic, the average charge per ton was divided by the average haul of interstate freight, producing a result of .1092 cent. That is to say, by reason of the difference between the number of tons of state traffic and the number of tons of interstate traffic hauled by the carrier, and the variation in the length of haul between these two kinds of traffic, there is chargeable for expenses other than haulage .1659 cent on the local traffic and .1092 cent on the interstate traffic.[12]

The Commission then proceeded to ascertain the cost per ton mile for haulage. This was accomplished by divid-

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11 The Commonwealth of Kentucky *v.* the Louisville and Nashville Railroad Company, *et al.*, before the Railroad Commission of Kentucky, 1906.

12 The expenses for terminal charges, damage, advertising, etc., were therefore 51 per cent more on intra-state traffic than on interstate traffic.

ing the operating expenses for the state traffic by the number of ton miles of state traffic, which produced a haulage charge per ton mile of .3884 cent. To this amount chargeable for haulage (.3884 cent) was added the cost for charges other than haulage (.1659 cent) producing the fair estimated cost of all service for state traffic per ton mile, .5543 cent. By the same method the interstate cost for haulage was found to be .4976 cent per ton mile. That is to say, the cost of haulage was estimated to be the same upon state traffic as upon interstate traffic, while the cost for stations and other services except haulage, is more upon intra- than upon interstate traffic.[13]

At this point the Kentucky Railroad Commission approached the serious question of the value of the physical property within the State and the amount of money which ought to be earned upon it. The Commission having been furnished by the carrier the physical value of the property, and having ascertained the rate of interest which securities of this kind are accustomed to produce, the quotations on stocks and bonds being considered, it remained to ascertain how the fair valuation should be divided so that one portion of it should produce adequate revenue from state freight and another portion produce revenue from interstate freight. The first proposition is to separate this valuation into freight and passenger business. While the Kentucky Commission assumes that this separation must be made, it does not seem to have done so. Having determined the proper total amount to be earned by the carrier, from both inter- and intra-state business, it attempts to ascertain what shall be used as a basis for dividing this fund equitably as between the two kinds of traffic. "Certainly neither gross earnings nor net earnings can be a satisfactory basis of apportionment of these charges for this purpose, particularly where the purpose of apportionment is to determine the propriety of the rates from which gross earnings and net earnings result. In this case the earnings result from the rates in question. This annual charge for valuation is in a sense part of the carrier's cost, and to attempt to justify

[13] The total cost upon the ton mile basis on intra-state traffic as found in this case is 11.4 per cent more than on interstate traffic.

the apportionment of costs by the earnings resulting from rates, and then to justify the rates by the apportionment of costs based on the earnings resulting from the rates, would clearly be reasoning in a circle. Nor can any suitable basis for apportionment of this annual charge on account of valuation be derived from transportation statistics relating to passengers and freight, for the obvious reason that there is no common transportation unit, except the train-mile or car-mile, and the use of the train-mile or car-mile would give no help in apportioning between state freight and interstate freight, because no trains are devoted solely to either class of freight, nor is any considerable number of cars assigned exclusively to either class of freight.

"Plainly, then, we have left only the operating expenses as a basis of apportionment."

Having determined that the operating expenses are the only available basis for apportionment, and being in possession of the operating expenses for both state and interstate traffic and of the amount of money which would be needed to pay interest, it ascertained that the interest fund was 43.95 per cent of the cost of operation. It then took the operating expenses chargeable against state freight which it multiplied by 43.95 to ascertain how much money should be derived from the state business in order to contribute to the interest fund; that contribution was found to be $542,744. This sum was added to the state operating expenses and was held to represent the fair amount which the carrier should receive from the state traffic because it included the two elements of actual cost of operation and a surplus with which to pay interest.

Commenting upon its own method the Commission said:

"The Commission does not, of course, undertake to say that the computations, the results of which are hereinbefore set forth, are mathematically accurate, for it is universally conceded that any exact statement of the cost to a carrier for performing its freight service as compared with its passenger service, or for performing a part of the freight service as compared with the remainder, can not be made. The Commission has merely done the best it could with the figures and facts before it, but it has endeavored in all its

computations to make the most liberal allowance for actual valuation. Yet, with all this, we have a result showing charges by this carrier for intra-state traffic, within the State of Kentucky, which are more than $774,000, in excess of just and reasonable rates.''[14]

From the adjudicated court cases it seems reasonably certain that the method used by the Supreme Court in Smyth *v.* Ames is inaccurate, for the relation which operating expenses bear to gross receipts does not and can never show the cost of transporting the commodities. The method used by the Circuit Court of the United States for the District of South Dakota could not stand the tests applied by the Supreme Court of the United States, which tests, it will be recalled, were different from the method formally used by that tribunal. The method used by the Kentucky Railroad Commission is clearly more elaborate, if not more correct, than those to which reference has been made by the Supreme Court.

While the method of the Kentucky Railroad Commission is most elaborate, yet to determine with mathematical accuracy the cost of traffic, a definite method has not as yet been devised. The difficulty is twofold. First, on the one line of road, with a single equipment, two kinds of traffic are carried. How is the capital to be separated for the purpose of producing revenue upon these two kinds of traffic. Again, the method used by the Kentucky Commission considers the whole schedule of rates, rates in gross, and secures its results in figures per ton per mile. In short, in the same focus it takes a broad survey of all kinds of commodities in the two kinds of traffic, and microscopically looks at the smallest possible unit of measurement. The shipment of a box of books is augmented to per ton per mile; a shipment of a carload or trainload of vegetables is reduced to the same unit. While this unit may be used in mathematics, it can be

[14] For the Louisville and Nashville Railroad and some other carriers, the Commission prescribed a schedule of rates based upon these findings. The schedule covers seventeen classes and distances from ten miles and less to four hundred and fifty miles (by five-mile steps to one hundred miles, and by ten-mile steps to two hundred and fifty miles, and by twenty-five-mile steps to four hundred and fifty miles).

confidentially asserted that it rarely, if ever, enters the head of a traffic manager making rates; ordinarily he does not consider the cost of traffic, for he does not know it.

The difficulties in this matter seem to be the unwarranted assumptions—legal fictions, as it were—within which there might be such a variation as to cause rates (single or as a schedule) to be unreasonably low on the one hand or extortionate on the other. The assumption that the future quantity of traffic will remain the same,[15] the assumption that the average haul of both inter- and intra-state traffic will not be materially different, the assumption that operating expenses for a particular year are reasonable, the assumption what shall constitute fair valuation of the carrier's property, the amount of tonnage it will transport, the fair rate of return, the arbitrary rule that all parts of the road cost the same to operate per unit,[16] the equally arbitrary rule that the rate of return ought to be the same for all roads and branches of roads, that the unit of per ton mile is a safe and equitable one, that any unit ought to apply to the eight thousand articles in numerous classes, that terminal expenses are the same for all classes of commodities, that the haul on interstate traffic costs the same as on local traffic, and finally, but by no means unimportant, that the carrier shall give us correct figures. These assumptions heretofore made may and

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[15] It was said by Mr. Justice Brewer in Chicago Grand Trunk Railway Company *v.* Wellman (143 U. S. 339), "Must it be declared, as matter of law, that a reduction of rates necessarily diminishes income? May it not be possible—indeed, does not all experience suggest the probability—that a reduction in rates will increase the amount of business, and, therefore, the earnings?"

These suggestive queries were quoted and approved by Mr. Justice Shiras in St. L. & S. F. Ry. Co. *v.* Gill (156 U. S. 648).

[16] It is curious to note that a former president of the Louisville and Nashville Railroad analyzed the cost of carrying freight on the main line and on each of the different branches. Mr. Albert Fink summed up as follows: "A careful investigation shows that, under ordinary conditions under which transportation service is generally performed, the cost per ton mile in some instances may not exceed one-seventh of a cent and in others will be as high as seventy-three cents per ton mile on the same road." That is to say, the cost may vary from one to five hundred. It is said that the receipts of the Paris and Lyons Company from Paris to Marseilles, about one-eighth of the entire trackage, produces one-half the net earnings of the company.

may not be true. Until proven correct, we cannot hope to ascertain to a mathematical certainty the cost of transportation to the carrier by any of the methods considered or one hereafter to be devised.

WASHINGTON, D. C., February, 1907.

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